

1969

**OPERATING
SUMMARY**

DUNNVILLE

(REGIONAL)

water

treatment

plant

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ONTARIO WATER RESOURCES COMMISSION

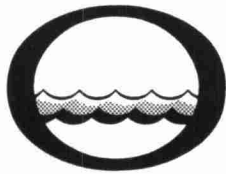
Division of Plant Operations

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Water management in Ontario

Ontario
Water Resources
Commission


135 St. Clair Ave. W.
Toronto 195
Ontario

The operating efficiency and financial status of the water treatment facilities operated for you in 1969 are presented in the following pages.

The regional operations engineer's comments and the statistical data will assist you in gauging the plant's level of performance. A new flow chart and up-to-date design data are also provided.

Various divisions and sections within the Commission have co-operated in providing what we trust is an accurate and concise annual operating summary.


D. S. Caverly,
General Manager.


D. A. McTavish, P. Eng.,
Director,
Division of Plant Operations.



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DUNNVILLE REGIONAL
water treatment plant

operated for

THE TOWN OF DUNNVILLE

THE ELECTRIC REDUCTION COMPANY LIMITED

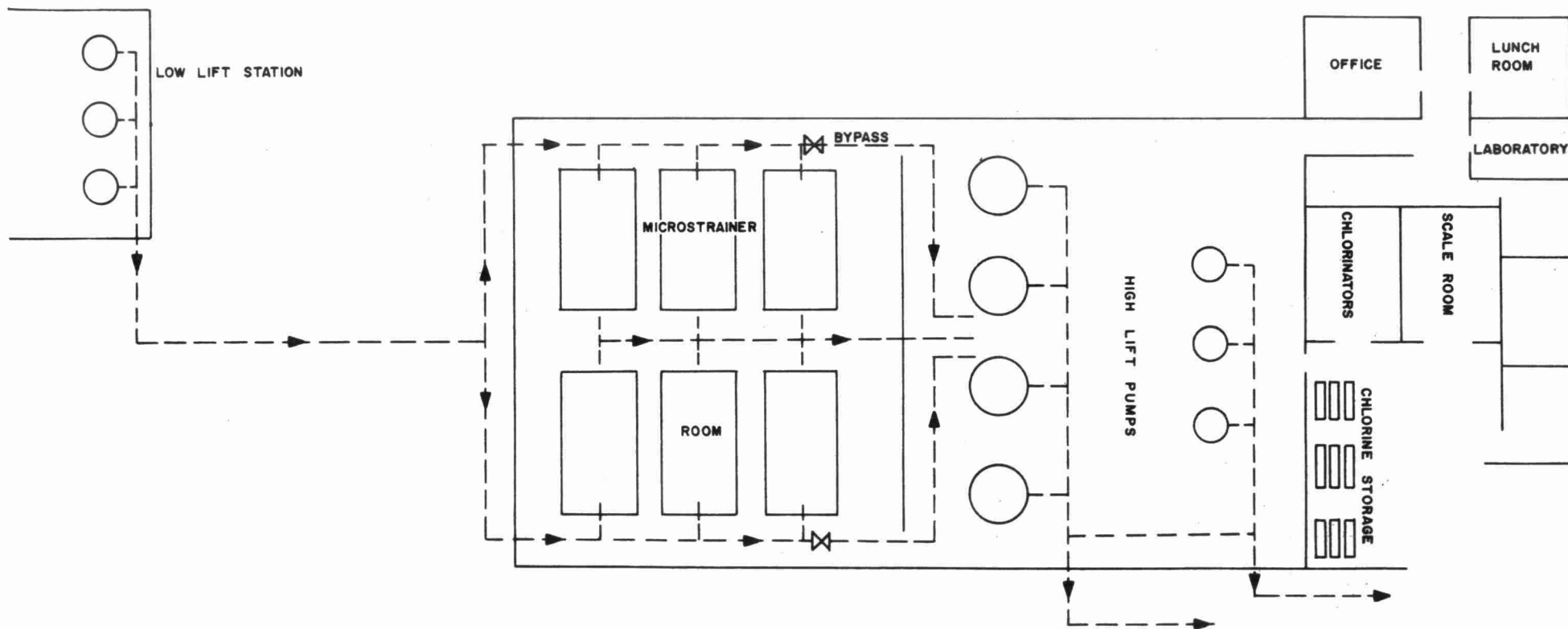
SHERBROOKE METALLURGICAL COMPANY LIMITED

by the

ONTARIO WATER RESOURCES COMMISSION

1969 ANNUAL OPERATING SUMMARY

DUNNVILLE REGIONAL WATER TREATMENT PLANT



DESIGN DATA

PROJECT NO. 6-0017-58

NOMINAL CAPACITY 20.5 mgd

RAW WATER SOURCE: Lake Erie

INTAKE

Depth of Intake - 25 ft.

Intake Pipe

Size: 1600 ft of 48" dia asbestos bonded
corrugated metal

LOW LIFT PUMPING STATION

Screens

Four removable screens 5' 6" sq with
3/8" openings

Low Lift Pumps

Type: Byron Jackson vertical turbine
Size: Three 5700 gpm @ 38 ft TDH

MICROSTRAINER

Type: Glenfield & Kennedy with MK 1
fabrice (opening size 35 microns)
Size: Six 10' x 10'

CLEARWELL

Size: Two compartments, total capacity
200,000 gal.

CHLORINATION

Chlorinator

Type: W & T A-711

Size: Two 2000 lb per day

Chlorine added at entrance to clear well

HIGH LIFT PUMPS

Supply to Dunnville(via 23,000 ft of 16" dia
asbestos cement pipe)

Type: Wheeler Economy single stage

Size: One 1000 gpm @ 135' TDH

One 1200 gpm @ 135' TDH

Supply to Port Maitland (via 20,000 ft of
30" dia asbestos cement pipe)

Type: Worthington single stage

Size: Four 4000 gpm @ 200' TDH

'69 REVIEW

GENERAL

The total plant output during 1969 was 3353 million gallons, an average daily output of 9.19 million gallons. This represents a decrease of about two percent from 1968.

The total operating cost per 1000 gallons was 3.42 cents as opposed to 3.06 cents in 1968. The total cost, which comprises operating, interest, debt retirement, and reserve fund charges was 9.60 cents per 1000 gallons as opposed to 9.14 cents per 1000 gallons in 1968.

Slush ice, frazil ice and algae caused operational difficulties during 1969, but it was not necessary to restrict flow to the participants on these occasions.

A new control valve and positioner was installed in the Dunnville main to provide a more sensitive control of flows. An inspection indicated that both the crib and intake were free of any serious obstructions and were in good condition.

A comprehensive program of microstrainer cleaning and painting was completed during 1969. In addition, preliminary arrangements were made for a major overhaul of two microstrainer units.

The installation of a travelling water screen began with the preparation of plans and specifications by the consulting engineer.

FLOWS

A total of 3353.02 million gallons of treated water was pumped to the industries in Port Maitland and the Town of Dunnville in 1969. The total flow to the Town of Dunnville was 387.15 million gallons or 11.5 percent of the total plant output. Electric Reduction used 1024.14 million gallons or 30.5 percent, while Sherbrooke Metallurgical used 1941.73 million gallons or 57.9 percent of the total plant output. The net result was a decrease in total plant flow output. The net result was a decrease in total plant flow of two percent in relation to 1968 total flow.

WATER QUALITY

A total of 45 samples of raw water and 45 samples of treated water were submitted in 1969 to the OWRC Laboratory for chemical analysis. The table provides information on OWRC standards, and the average, maximum and minimum values as determined by analysis. The chemical and physical constituents listed are dissolved in both the raw and treated water, since there is no chemical treatment at the plant. The averages are therefore substantially the same.

ALGAE ENUMERATION AND IDENTIFICATION

Algae, in addition to their ability to cause obnoxious tastes and odours, may modify the pH, alkalinity, colour, turbidity and radioactivity of the

water. Corrosive activity of the water is often increased as a result of algae growth. Although there is no record of pathogenic species of algae toxic to humans, there are algae which produce toxic organic substances causing the death of wild and domestic animals. Algae have been regarded with some suspicion in cases of a general outbreak of gastro-intestinal disorders among persons using a common water supply.

Most of the algae of importance in water supplies may be categorized into four general groups - the greens, blue greens, diatoms and flagellates. The enumerations performed at the Dunnville plant have revealed that the greatest portion of algae in this area of the lake came from the greens and diatoms. Microstrainers at the plant are successful in removing a great proportion of the algae in the raw water.

The graph shows the seasonal variations of algae in raw water.

TURBIDITY

The turbidity of water is a measure of the interference presented by suspended matter to the passage of light. This measurement therefore indirectly measures the suspended matter such as clay, finely divided organic matter, silt, and microscopic organisms present in the water.

The microstrainers at the Dunnville Regional Treatment plant are designed to remove only the larger micro-organisms, particularly algae. It can be seen from the graph of turbidity measurements that the treatment process does not significantly reduce the turbidity of the raw water. It may be deduced from these results that the major source of turbidity in raw water is caused by substances smaller than can be removed by the micro-strainers.

The OWRC standard for drinking water specifies a turbidity limit of one Jackson Turbidity Unit. This standard was never achieved in 1969. The average treated water turbidity for the year was approximately nine units.

The worst lake conditions were encountered during the month of April, when the average turbidity was 20 units. Generally, the best quality of water, using turbidity as a standard, was obtained during the summer months.

CHLORINATION and DISINFECTION

A total of 52 raw water samples and 154 treated water samples were submitted to the OWRC Laboratory for bacteriological analysis in 1969. The treated water samples were collected from the end of the Dunnville and Port Maitland mains and either Grandview School and Camp Goforth in Dunn Township. Of the 154 treated water samples, 152 were satisfactory.

CONCLUSIONS

The Dunnville Regional water supply system operated effectively during 1969. A number of major maintenance programs were completed or initiated in 1969 to ensure all equipment and structures remained in top condition. It is expected that the installation of a travelling water screen in 1970 will eliminate the project's operational problems with algae and slush ice removal.

PROJECT COSTS

Long Term Debt to OWRC - (Revised Estimated)

Dunnville	\$ 546,880.86	
Electric	1,109,956.28	
Sherbrooke	911,769.49	
	<u> </u>	<u><u>\$2,568,606.63</u></u>

Debt Retirement Balance at Credit (Sinking Fund) December 31, 1969

Dunnville	\$ 126,651.77	
Electric	259,356.48	
Sherbrooke	213,421.16	
	<u> </u>	<u><u>\$ 599,429.41</u></u>

The total cost to the participants during 1969 was as follows:

Net Operating

Dunnville	\$ 21,369.68	
Electric	51,278.05	
Sherbrooke	<u>42,119.61</u>	\$ 114,767.34

Debt Retirement

Dunnville	\$ 11,036.05	
Electric	22,398.92	
Sherbrooke	<u>18,399.51</u>	\$ 51,834.48

Reserve

Dunnville	\$ 2,543.90	
Electric	4,962.68	
Sherbrooke	<u>4,086.52</u>	\$ 11,593.10

Interest Charged

Dunnville	\$ 30,611.80	
Electric	62,129.45	
Sherbrooke	<u>51,043.64</u>	\$ 143,784.89

TOTAL

\$ 321,979.81

RESERVE ACCOUNT

Balance at January 1, 1969

Dunnville	\$ 20,150.74	
Electric	47,958.31	
Sherbrooke	<u>38,891.08</u>	\$ 107,000.13

Deposited by Participant

Dunnville	\$ 2,543.90	
Electric	4,962.68	
Sherbrooke	<u>4,086.52</u>	\$ 11,593.10

Interest Earned

Dunnville	\$ 1,145.17	
Electric	2,835.37	
Sherbrooke	<u>2,300.30</u>	\$ 6,280.84

TOTAL

\$ 124,930.59

Less Expenditures

Dunnville	\$ 505.51	
Electric	1,214.41	
Sherbrooke	<u>999.32</u>	\$ 2,719.24

Balance at December 31, 1969

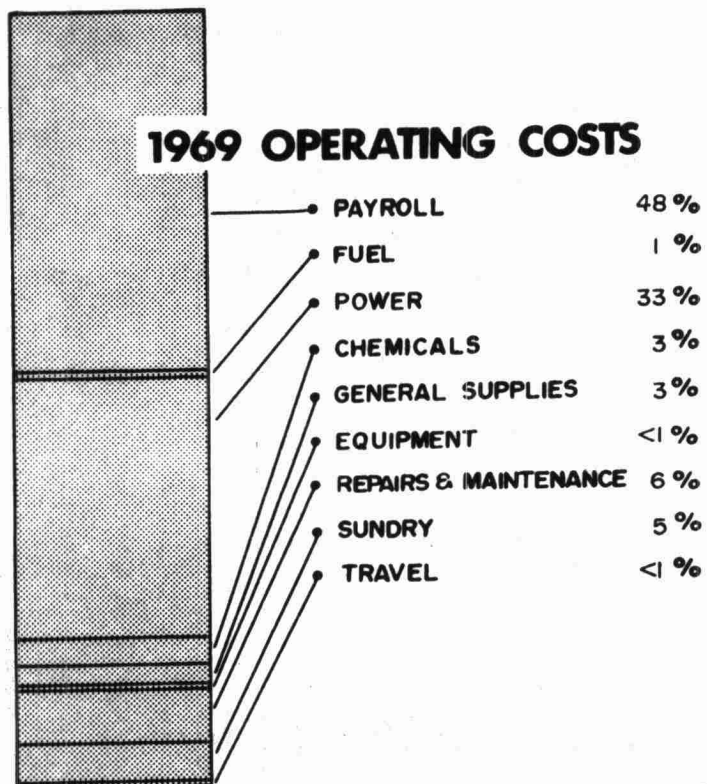
Dunnville	\$ 23,380.31	
Electric	54,516.71	
Sherbrooke	<u>44,257.81</u>	\$ <u>122,154.83</u>

SUMMARY OF WATER COSTS

Year	Mil. Gal. Treated	Operating Cost	Operating Cost per 1,000 gallons	Total Cost	Total Cost per 1,000 gallons
1965	3692.889	\$ 98,485.34	2.67¢	\$311,630.93	8.44¢
1966	3802.109	98,983.63	2.60¢	308,574.01	8.12¢
1967	3714.052	105,380.00	2.84¢	314,660.32	8.47¢
1968	3422.067	104,861.63	3.06¢	312,713.65	9.14¢
1969	3353.020	114,767.34	3.42¢	321,797.81	9.60¢

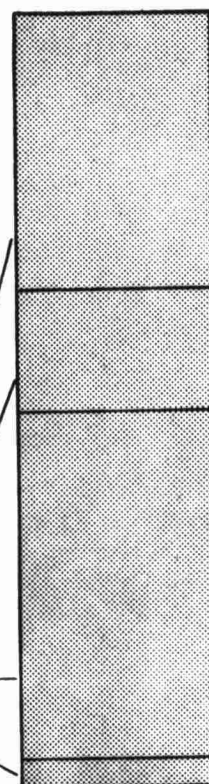
COST TO EACH PARTICIPANT IN 1969

Participant	Mil. Gal. Used	Operating Cost	Operating Cost per 1,000 gallons	Total Cost	Total Cost per 1,000 gallons
Town of Dunnville	387.15	21,369.68	5.52¢	65,561.43	16.93¢
Electric Reduction	1024.14	51,278.05	5.01¢	140,769.10	13.74¢
Sherbrooke Metallurgical	1941.73	42,119.61	2.17¢	115,649.28	5.96¢



TOTAL ANNUAL COST

NET OPERATING	36 %
DEBT RETIREMENT	16 %
INTEREST	44 %
RESERVE FUND	4 %

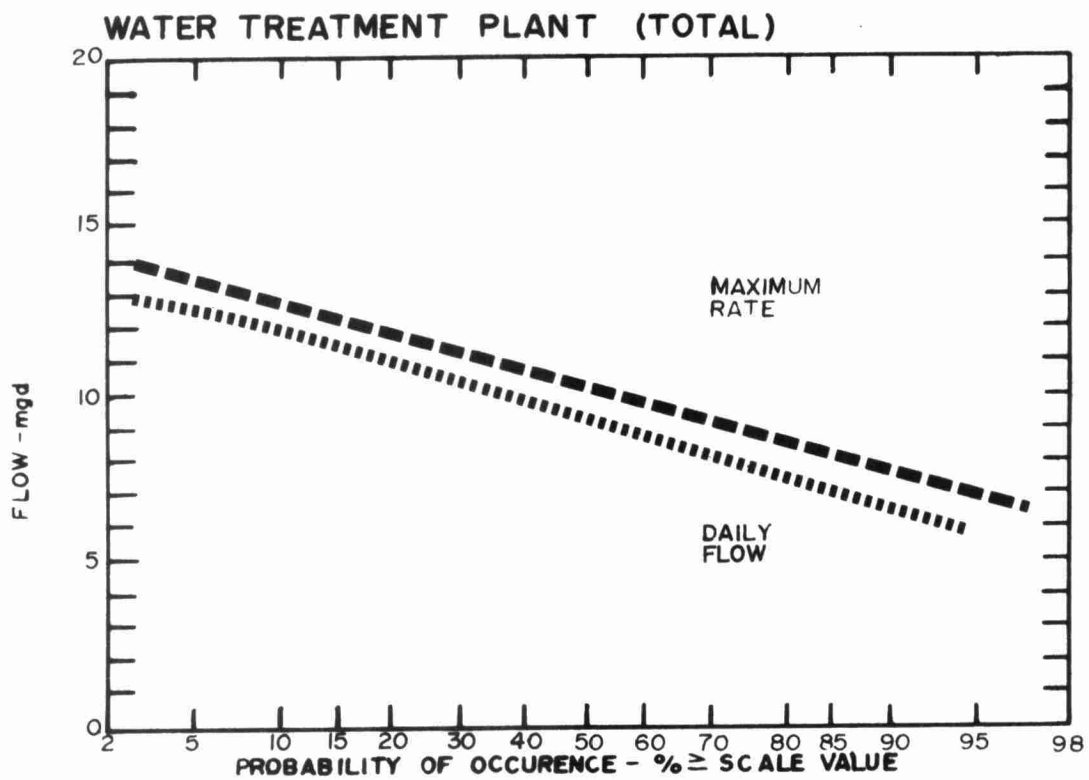


Monthly Operating Costs

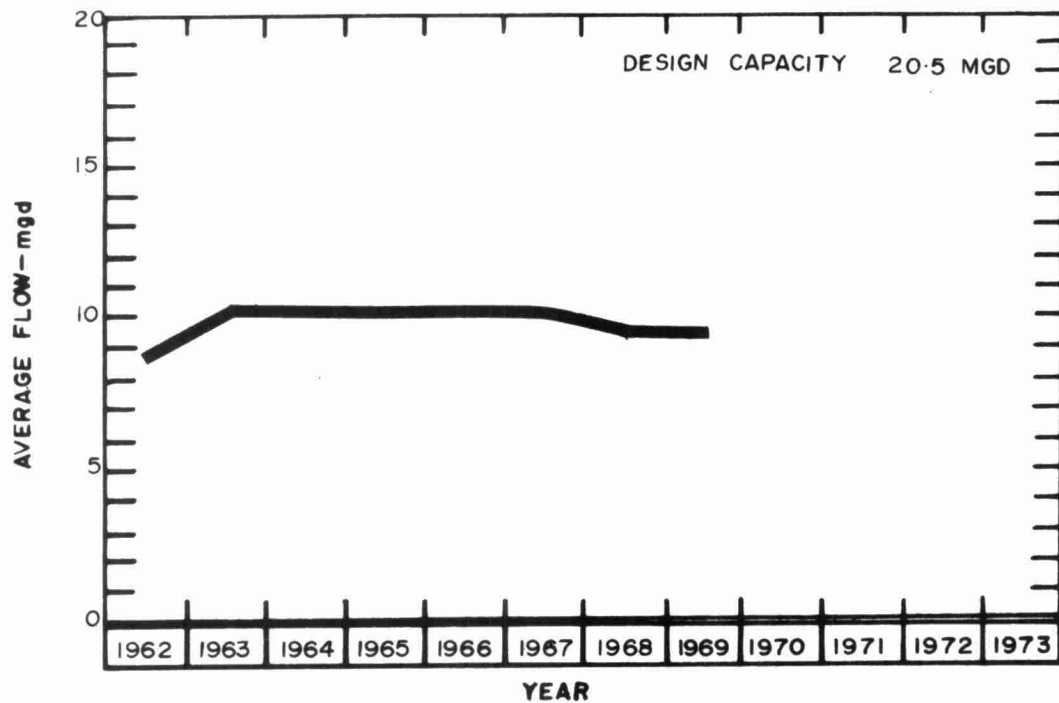
MONTH	TOTAL	PAYROLL	CASUAL	FUEL	POWER	CHEMICAL	GENERAL SUPPLIES	EQUIPMENT	REPAIRS & MAINTENANCE	SUNDRY	TRAVEL
JAN	6872.13	5925.21	-	226.09	-	-	94.52	-	513.70	56.21	72.45
FEB	14374.19	3906.53	-	130.23	6311.37	1050.00	211.93	-	129.34	2634.79	-
MAR	8336.87	3842.76	-	210.32	3096.78	-	162.72	84.48	452.44	487.37	-
APRIL	8281.00	3950.79	91.20	152.65	2729.71	306.00	191.14	9.61	593.29	163.91	107.70
MAY	3484.83	4253.16	360.89	156.74	-	54.60	277.33	273.46	565.47	(2456.76)	-
JUNE	10648.23	3941.32	683.12	53.85	5378.13	-	254.34	-	222.24	115.23	-
JULY	7841.59	3292.28	711.77	2.26	3154.42	-	228.56	288.76	-	70.25	109.40
AUG	7923.42	5806.14	893.95	-	-	896.00	153.00	-	172.72	1.61	-
SEPT	16655.75	4099.64	562.81	4.21	6625.64	376.05	467.88	66.15	1475.53	2977.84	-
OCT	4969.63	3900.02	535.07	19.86	-	-	303.04	-	-	60.65	150.99
NOV	13370.37	3807.47	352.02	11.21	7052.55	-	296.27	-	1754.31	116.40	-
DEC	12009.33	4020.94	266.86	90.73	2992.17	954.50	435.46	-	1333.44	1891.43	23.80
TOTAL	114767.34	50746.20	4457.69	1058.15	37340.77	3637.15	3076.19	722.46	7212.48	6118.93	464.34

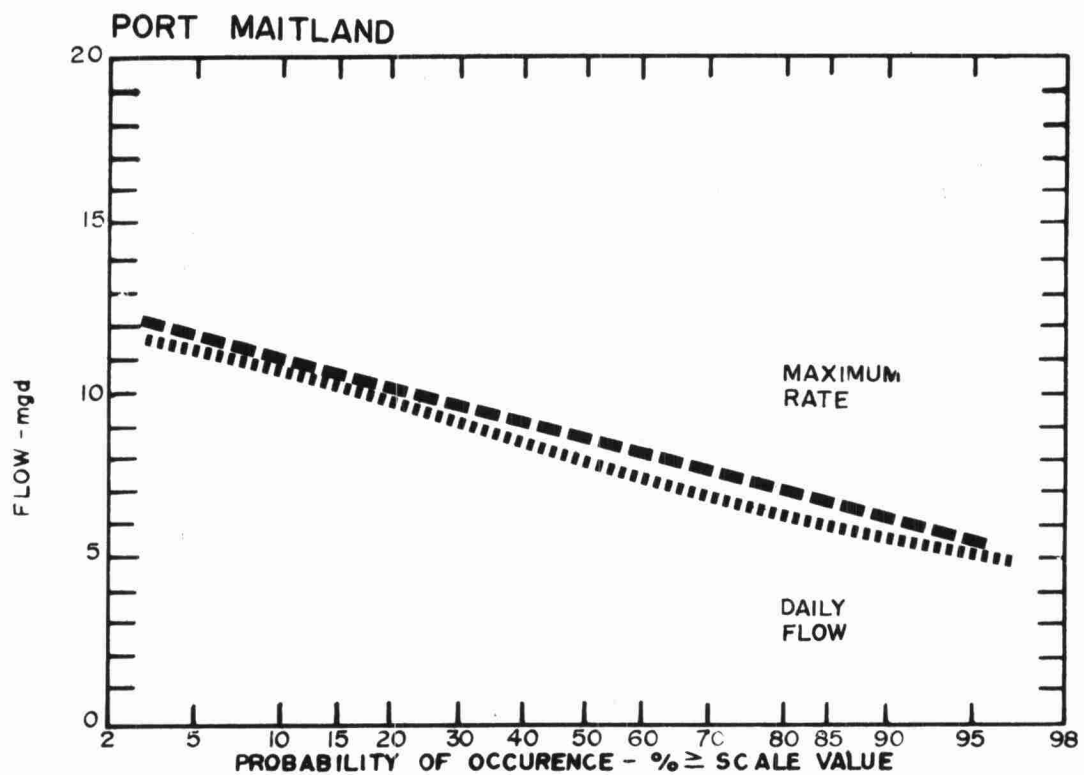
BRACKETS INDICATE CREDIT

PROCESS DATA

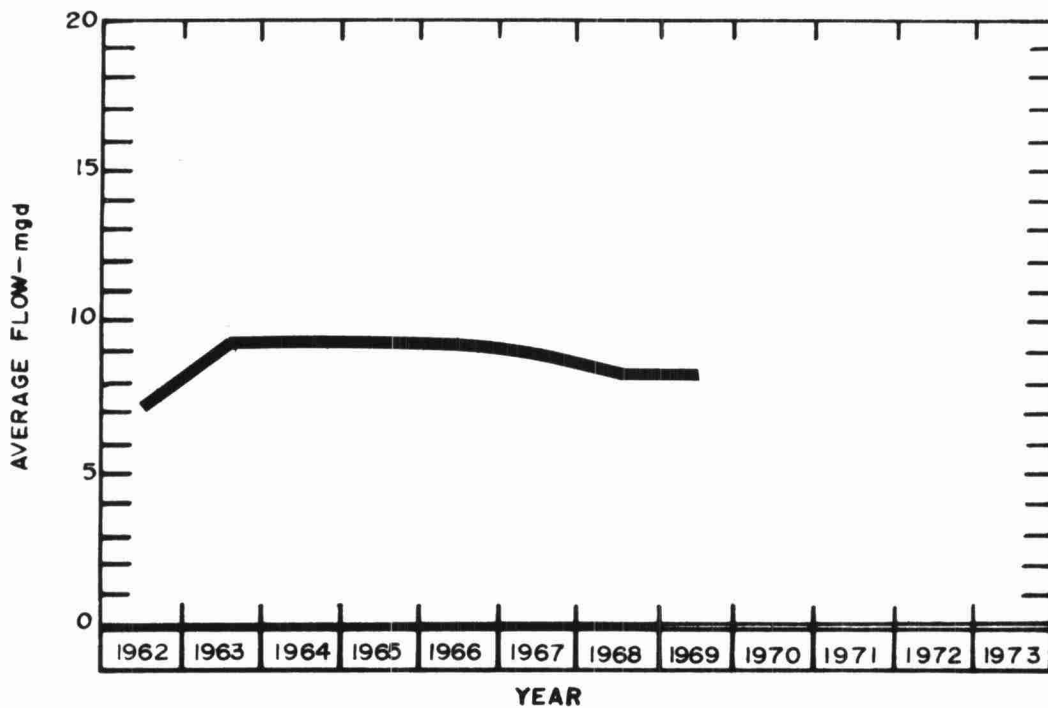


FL O W S





F L O W S



PLANT FLOWS

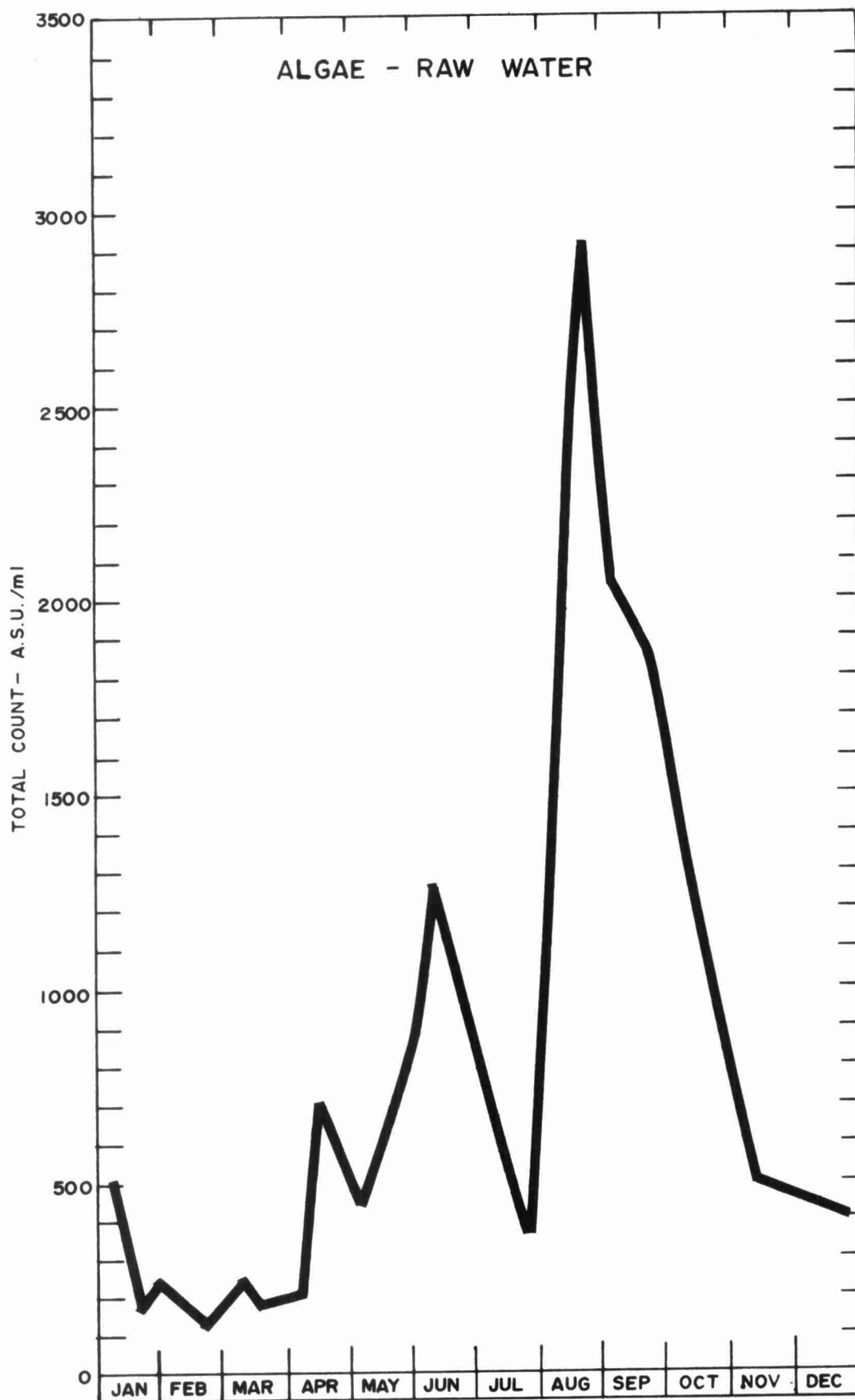
MONTH	TOTAL FLOW mil gal	AVERAGE DAILY FLOW mil gal	MAXIMUM DAILY FLOW mil gal	MINIMUM DAILY FLOW mil gal	TOWN OF DUNNVILLE mil gal	ELECTRIC REDUCTION CO. mil gal	SHERBROOKE METALLURGICAL mil gal
JAN	273.15	8.81	10.64	7.13	29.49	128.32	115.34
FEB	271.46	9.70	10.41	8.42	30.14	112.54	128.78
MAR	239.19	7.72	10.10	5.59	27.19	64.65	147.35
APR	191.51	6.38	7.24	5.55	27.55	32.10	131.86
MAY	236.43	7.63	8.50	4.96	29.76	54.32	152.35
JUNE	244.45	8.15	10.93	7.15	34.21	48.66	161.58
JULY	328.59	10.60	11.41	8.40	37.10	67.24	224.25
AUG	339.68	10.96	13.37	6.11	43.03	99.73	196.92
SEPT	335.57	11.19	12.92	8.20	39.74	94.72	201.12
OCT	357.21	11.52	13.47	8.98	31.24	122.94	203.03
NOV	289.07	9.64	11.67	6.41	29.27	102.38	157.42
DEC	246.70	7.96	9.55	5.22	28.43	96.54	121.73
TOTAL	3353.02	-	-	-	387.15	1024.14	1941.73
AVERAGE	279.42	9.19	-	-	32.26	85.35	161.81

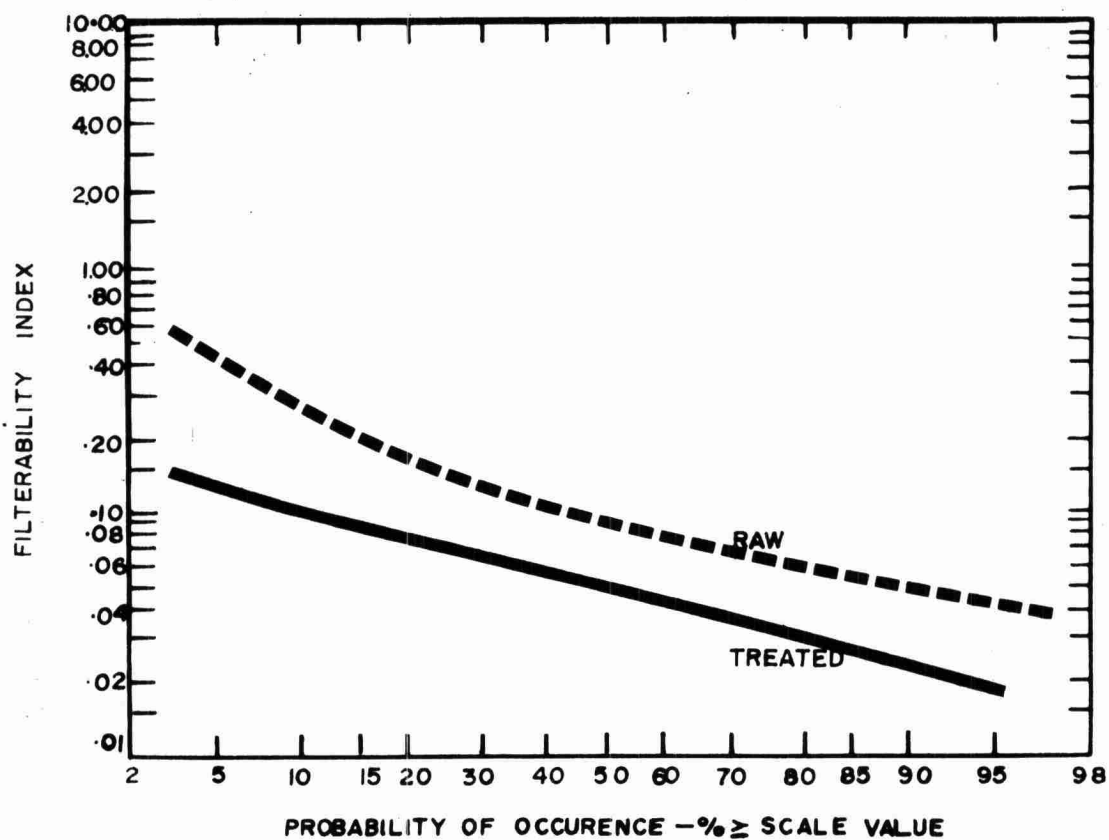
WATER QUALITY

PROPERTY	RAW WATER				TREATED WATER				DESIRABLE STANDARDS
	NUMBER OF SAMPLES	AVG	MAX	MIN	NUMBER OF SAMPLES	AVG	MAX	MIN	
HARDNESS mg/l CaCO_3	9	141	152	133	9	139	156	132	80 - 100
ALKALINITY mg/l CaCO_3	9	105	121	98	9	101	106	97	30 - 100
IRON mg/l Fe	9	.54	1.60	.10	9	.39	1.60	.05	< 0.3
COLOUR apparent colour units	9	9	30	5	9	8	30	5	< 5
CHLORIDE mg/l Cl^-	9	25	27	16	9	26	28	17	< 250

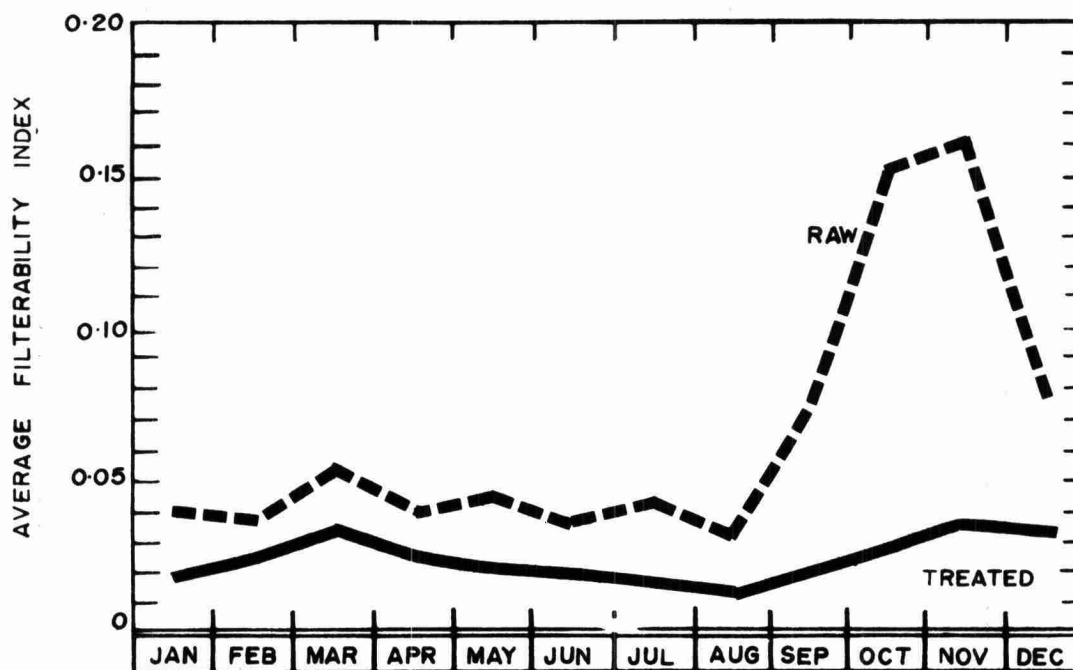
1969 FLOW HIGHLIGHTS

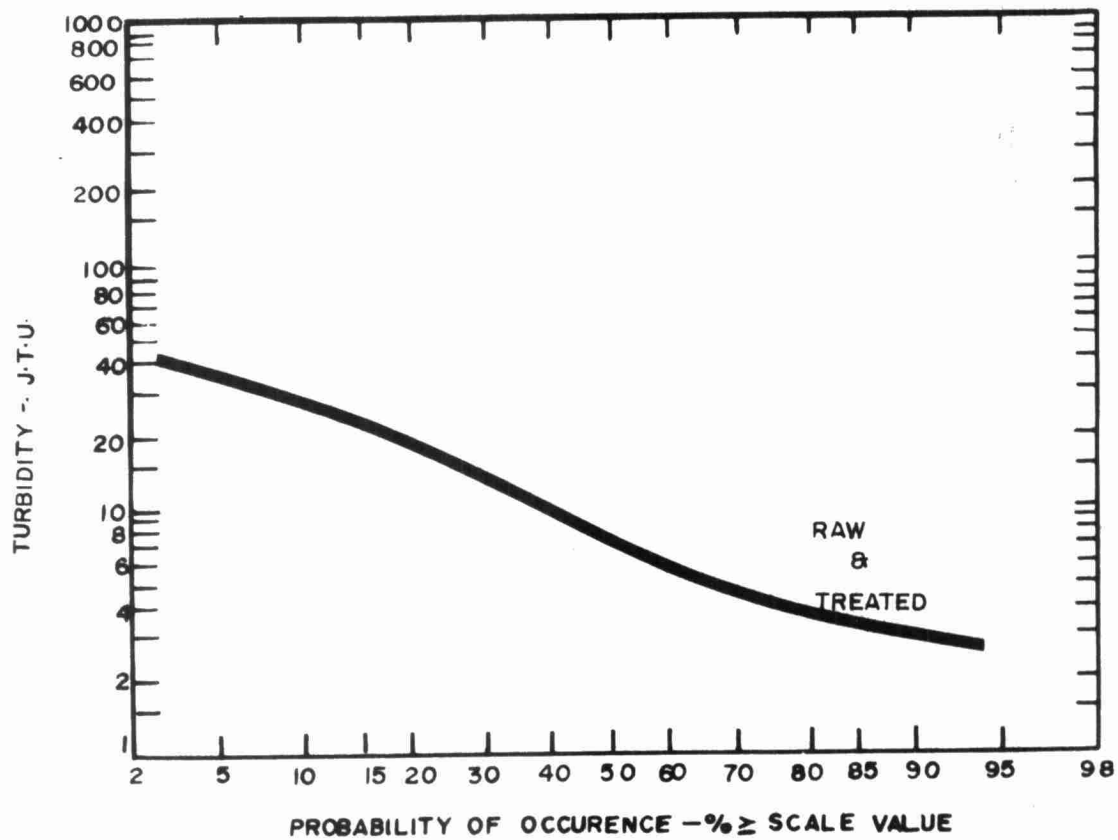
DESCRIPTION	PLANT		DUNNVILLE		PORT MAITLAND	
	DATE	FLOW mgd	DATE	FLOW mgd	DATE	FLOW mgd
MAXIMUM MONTH	Oct.	11.52	Sept.	1.32	Oct.	10.52
MINIMUM MONTH	Dec.	7.96	Mar.	0.88	Apr.	5.47
MAXIMUM WEEK	Oct.	11.92	Aug.	1.51	Oct.	10.96
MAXIMUM DAY	Oct.	13.47	Jan.	1.73	Oct.	12.37
MINIMUM DAY	May	4.96	Jan.	0.66	June	3.82
MAXIMUM RATE (instantaneous)	Oct.	14.832	Jan. Feb. Apr.	2.88	Oct.	12.84



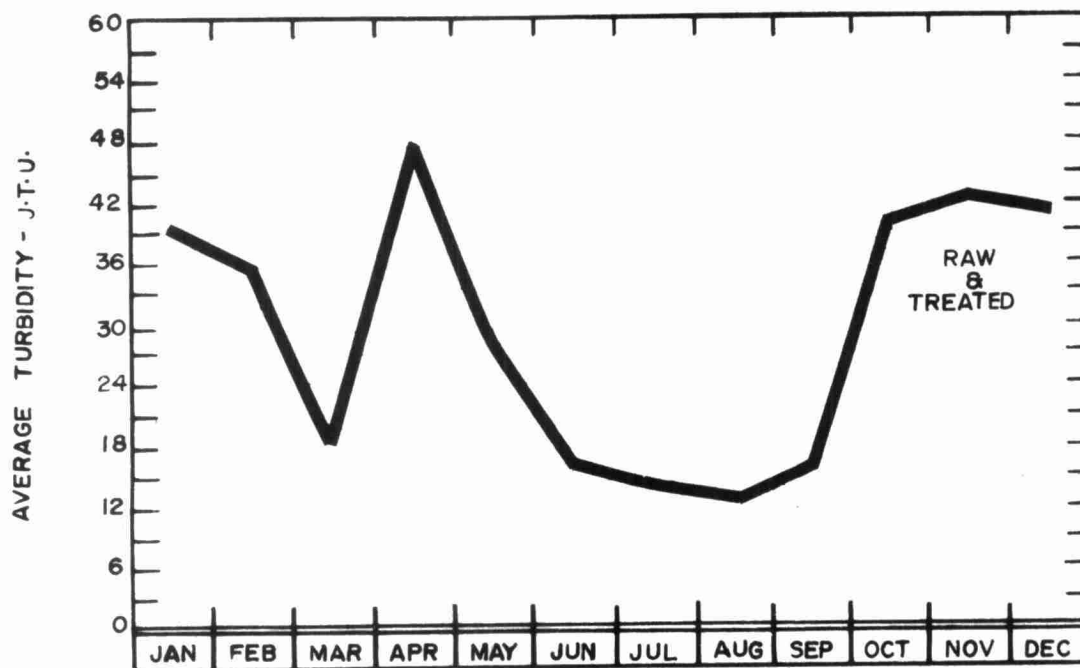


FILTERABILITY INDEX





TURBIDITY



CHLORINATION and DISINFECTION

MONTH	COLIFORM				CHLORINATION	
	RAW WATER		TREATED WATER		CHLORINE USED pounds	CHLORINE DOSAGE mg/l
	NUMBER OF SAMPLES TAKEN	AVERAGE DENSITY No / 100 ml	NUMBER OF SAMPLES TAKEN	NUMBER WITH COLIFORMS > 0/100 ml		
JAN	4	2581	12	0	3124	1.1
FEB	4	220	12	0	3182	1.2
MAR	5	65	15	0	2600	1.1
APR	4	85	11	0	2508	1.3
MAY	4	20	12	0	2898	1.2
JUNE	4	98716	12	0	2556	1.0
JULY	5	238	15	0	3464	1.1
AUG	4	633	11	0	3218	0.9
SEPT	5	686	15	0	3138	0.9
OCT	4	699	12	0	3520	1.0
NOV	4	2400	12	1	2988	1.0
DEC	5	444	15	1	2514	1.0
TOTAL	52	-	154	-	-	-
AVERAGE	-	-	-	-	-	-

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